## Remarks and Arguments

Applicant's attorney wishes to thank the examiner for his time in conducting a telephone interview on February 24, 2009. The substance of that interview is discussed below.

Claims 1, 4-8 and 11-19 were presented for examination. Claims 1, 4 and 7-9 have been canceled. Claims 5, 6, 11, 13, 17 and 18 have been amended. Claim 20 has been added.

Claims 1, 4-8 and 11-19 have been rejected under 35 U.S.C. §112, first paragraph, for failing to comply with the written description requirement. The examiner comments that claim 1, as amended, recites that an electrical contact is established between a metal surface on a nanoparticle and a contact spot "without destroying the nanoparticle." The examiner contends that the specification, as originally filed, does not provide a basis for the limitation "without destroying the nanoparticle."

In response, claim 1 has been canceled and rewritten as new claim 20. Care has been taken to eliminate any limitations not found in the specification as originally filed, including the limitation "without destroying the nanoparticle." It is believed that claim 20, as presently written, meets the requirements of 35 U.S.C. §112, first paragraph.

Claims 1, 4, 7 and 8 have been rejected under 35 U.S.C. §103(a) as obvious over Wang (previously cited) in view of Jaya (previously cited) and Knoll (previously cited). The examiner comments that Wang and Jaya teach methods for the detection of nucleic acids by means of metal nanoparticles and by detecting the current or voltage produced by a galvanic cell, but the movement of metal to a contact spot as taught by Wang and Jaya is different than the movement of metal as claimed. However, the examiner considers that the physical movement of metal through space to specific locations is taught by Knoll. The examiner thus maintains the rejections of claims 1, 4, 7 and 8.

As discussed in the telephone interview, one of the key differences between the cited art and the claimed invention is that, in the invention, metal-coated nanoparticles bound to an analyte are physically moved to establish an electrical contact between the metal surfaces on the nanoparticles and a contact spot. Because the metal surfaces on the nanoparticles and a metal countersurface form the electrodes of a galvanic cell, the

current or voltage generated by the galvanic cell are detected by an electronic circuit connected to the countersurface and the contact spot, thereby indicating the presence of the analyte. In this process, it is not necessary for the metal surfaces of the nanoparticles and the countersurface to be dissolved into solution because the electrical contact is created by a physical touching of the metal surfaces.

In contrast, as discussed in detail, in the Wang and Jaya processes, the metal involved in the electrochemical cell is dissolved chemically (oxidation) and then the dissolved metal is deposited on the working electrode by applying electrical potentials to the electrodes of the setup (reduction). This clearly stated in Jaya, p. 1445, lines 14-24 and in Wang, p. 5578, left column. Thus, the metal is moved in solution and not via physical contact. In addition, as discussed in the response to the previous office communication, in the Knoll reference, the nanoparticles are electrically isolated and do not form one of the electrodes of a galvanic element. Thus, its combination with Wang and Jaya does not teach or suggest physically moving the nanoparticles to establish an electrical connection.

Claim 1 has been canceled and replaced by new claim 20 in order to particularly point out these differences. For example, claim 20, lines 18-26, recite "...in each circuit where nanoparticles are bound to the proximal probe molecules, physically moving the nanoparticles to establish an electrical contact between the metal surfaces on the nanoparticles and the contact spot; and ... determining in which circuits galvanic cells have formed by detecting one of a galvanic cell current and a galvanic cell voltage between the counterelectrode and the contact spot with the electronic detector circuit, so that the spatial pattern of circuits in which galvanic cells have formed measures the binding of the analyte molecules to the probe molecules." As discussed above, the combination of Wang, Jaya and Knoll does not disclose or suggest this concept. Therefore, new claim 20 patentably distinguishes over the cited references.

Claims 4, 7 and 8 have been amended to depend, either directly or indirectly on new claim 20, and incorporate the limitations thereof. Therefore, these latter claims also patentably distinguish over the cited reference combination in the same manner as new claim 20.

Claims 6, 18 and 19 have been rejected under 35 U.S.C. §103(a) as obvious over Wang, Jaya and Knoll in view of Henkens (previously cited.) The Henkens reference has been cited as disclosing both covalent binding and PCR techniques in conjunction with detection of nucleic acids using electrodes with immobilized probes. However, as previously discussed, Henkens does not disclose physical movement of the nanoparticles to create an electrical contact between the metal surfaces of the nanoparticles as now recited in claim 20 on which claims 6, 18 and 19 have been amended to depend.

Claims 5, 11 and 12 have been rejected under 35 U.S.C. §103(a) as obvious over Wang, Jaya and Knoll in view of Wohlstadter (previously cited.) The Wohlstadter reference has been additionally cited as disclosing use of a linking chain in the polyene class to insure low resistance transfer of electrons from an electrode. As discussed above, the Wang, Jaya and Knoll references do not teach physical movement of the nanoparticles to establish an electrical contact as recited in claim 20, the parent claim of claims 5, 11 and 12. Adding Wohlstadter to this combination does not change this conclusion because Wohlstadter detects the presence and quantity of the analyte molecules by electrochemiluminescence, not by forming a galvanic cell and then measuring the electrical properties of that element as recited.

Claims 13, 16 and 17 have been rejected under 35 U.S.C. §103(a) as obvious over Wang, Jaya and Knoll in view of Fish (previously cited.) Fish has been cited as disclosing the detection of analyte molecules with an electrode-based scheme in which an opposing surface with an electrode is moved to make contact with an electrically-readable particle. Combining Fish with Wang, Jaya and Knoll would not produce an arrangement which allows measurement of a galvanic cell current or voltage by physically moving nanoparticles to contact a contact spot because Wang, Jaya and Knoll do not disclose such a measurement process and Fish detects the presence and quantity of the analyte molecules by measuring electrical changes in a measuring cell, not by forming a galvanic cell and then measuring the electrical properties of that element as recited. Since claims 13, 16 and 17 are dependent on new claim 20 and incorporate the limitations thereof, they distinguish over the cited reference combination in the same manner as claim 20.

Claims 14 and 15 have been rejected under 35 U.S.C. §103(a) as obvious over Wang, Jaya and Knoll in view of Fish and further in view of Wohlstadter. Wohlstadter is cited as disclosing several electrode-based detection configurations in which an analyte is collected on a surface opposite to the surface on which the detecting electrode is mounted.

The combination of Wang, Jaya, Knoll and Fish has been discussed above and does not teach the measurement of galvanic cell properties as claimed. Adding Wohlstadter to this combination does not change this conclusion because Wohlstadter detects the presence and quantity of the analyte molecules by electrochemiluminescence, not by forming a galvanic cell and then measuring the electrical properties of that element as recited. Since claim 14 is dependent on new claim 20 and incorporates the limitations thereof, it distinguishes over the cited reference combination in the same manner as claim 20.

In light of the forgoing amendments and remarks, this application is now believed in condition for allowance and a notice of allowance is earnestly solicited. If the examiner has any further questions regarding this amendment, he is invited to call

applicants' attorney at the number listed below. The examiner is hereby authorized to charge any fees or direct any payment under 37 C.F.R. §§1.17, 1.16 to Deposit Account number 50-3969.

Respectfully submitted

/paul e. kudirka/ Date: 2009-03-09

Paul E. Kudirka, Esq. Reg. No. 26,931
LAW OFFICES OF PAUL E. KUDIRKA
Customer Number 64967
Tel: (617) 357-0010 Fax: (617) 357-0035